

APPENDIX A

Hydrology Monitoring Plan

REPORT

Hydrology Monitoring Plan

Coffee Gold Mine

Prepared for:

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REVISION TRACKING LOG

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2			

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LIST OF ACRONYMS AND ABBREVIATIONS

Acronym / Abbreviation	Definition
ADCP	Acoustic Doppler Current Profiler
BCMOE	British Columbia Ministry of Environment
EMR	Yukon Energy, Mines and Resources
EMAMP	Environmental Monitoring and Adaptive Management Plan
EoP	End of Pipe
EP	Event Pond
FPoD	Final point of discharge
HLF	Heap Leach Facility
MDMER	Metal and Diamond Mine Effluent Regulations
PT	Pressure transducer
QA/QC	Quality Assurance/Quality Control
RISC	Resource Inventory Standards Committee
WMO	World Meteorological Organization
WTP	Water Treatment Plant
WUL	Water Use License
YESAB	Yukon Environment and Socio-Economic Assessment Board

LIST OF SYMBOLS AND UNITS OF MEASURE

Symbol / Unit of Measure	Definition
m ³ /s	Cubic Metres per Second
L/s/km ²	Litres per Second per Square Kilometer (Unit Yield)
km ²	Square Kilometers
m	Meters
mm	Millimetres

1.0 INTRODUCTION

This plan describes hydrological monitoring of surface streams for the Coffee Gold Project (the Project). Hydrological monitoring is the systematic measurement of the quantity of surface water within the mine site, discharged as mine effluent, and in the receiving environment, to ensure that water quantity is within expected ranges. This plan describes hydrological monitoring across the Baseline, Construction, and Operations phases of the Project.

Hydrology (streamflow and mine site effluent discharges) is linked to several other disciplines and monitoring done to support these disciplines, which is discussed further in the Environmental Monitoring and Adaptive Management Plan (EMAMP) summary document. The results of the monitoring programs will be used collectively to assess effects of the Project on the environment. For example, short-term trends in water quality at a monitoring location may be caused by wetter or drier than average conditions, and not by changing geochemical factors. The flow records collected from both the mine site and receiving environment monitoring stations will also be critical in the management of the HLF, open pit mining operations, dust control, future exploration activities and water management infrastructure.

This plan is based on the Project Description mine layout and water management infrastructure. It reflects the current understanding of the baseline surface water and groundwater systems, including both quantity (flows) and quality. It includes a description of monitoring methods, baseline conditions, monitoring locations and frequency, and outlines monitoring procedures, including Quality Assurance/Quality Control (QA/QC) protocols. In addition, it outlines some key considerations for implementation. These, and other aspects of this Plan, will be updated periodically, as mine planning and development proceed.

Reference material used in the preparation of this plan includes:

- *Manual of British Columbia Hydrometric Standards - Version 2.0*. Prepared by Resource Inventory Standards Committee, Ministry of Environment, Science and Information Branch for the Resources Information Standards Committee, 2018
- *Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators*, B.C. Ministry of Environment, 2012
- *Manual of Operational Hydrology in British Columbia*, Water Management Branch of the BC Ministry of the Environment, 1991
- *Quartz Mining License Application Guide*, Yukon Government Department of Energy, Mines and Resources, 2010
- *Plan Requirement Guidance for Quartz Mining Projects*, Yukon Water Board, 2013
- *Water Management Standard*, Newmont Corporation, 2020
- *Water Management Standard Guideline*, Newmont Corporation, 2020.

This plan is subject to regular updates, as may be necessary as mine design, construction activities and mine operations progress, and as monitoring results are collected and evaluated.

2.0 OBJECTIVES

Hydrology includes streamflow and mine site effluent discharges, pond and pit lake levels and volumes, and is directly linked to other aquatic ecosystem components, including surface water quality, groundwater quality and fish and fish habitat. Monitoring conducted as per the Hydrology Monitoring Plan will:

- Collect data to evaluate potential adverse changes, the subsequent effectiveness of mitigation measures, and to characterize potential residual adverse changes
- Assess/confirm compliance with applicable standards, limits, and guidelines at discharge locations and within the receiving environment
- Allow the management of mine site effluent to be optimized so as to reduce the potential impacts to the receiving streams
- Verify and refine water quality predictions for the construction and operations phases
- Verify the water balance and provide the necessary data to update and refine water balance management.

To meet these objectives, monitoring will be conducted at three main areas:

1. **Mine site monitoring** will record the quantity of surface water that is affected by the various mine facilities. It is required primarily to guide water management activities within the mine site, and secondarily, to provide information required to calculate the proportion of loadings contributed to the final discharge points by each mine site component. Mine site monitoring includes monitoring of pit sump and sediment pond discharges, and other water management infrastructure.
2. **Effluent monitoring** records the quantity and quality of surface water that collects in sediment control ponds or other water management infrastructure, located downgradient of mine infrastructure, and is discharged to the receiving environment. Monitoring to ensure compliance with appropriate discharge limits for treated effluent pond discharges are important components of the plan and are expected to be subject to regulatory requirements.

Receiving environment monitoring will record the quantity of water in the receiving environment, downstream of mine inputs. Flows and water quality in the receiving environment downstream of the mine will reflect the ultimate effects of the mine.

3.0 MONITORING LOCATIONS AND FREQUENCIES

Hydrology monitoring is conducted within the area where the Project is reasonably expected to interact with streamflows, including all streams expected to receive effluent from the mine site, up to and including the Yukon River in the immediate vicinity of the confluence with Coffee Creek, YT-24 and Halfway Creek. A summary of the mine site and receiving environment monitoring stations are provided in Table 3-1 and Table 3-2, respectively. Station locations are provided in Table 3-3, and all monitoring stations are shown in Figure 3-1.

During Project Construction and Operations phases, the hydrologic monitoring program will be gradually phased in as the relevant mine components are built. Two sediment control ponds are proposed (Facility Pond and the Alpha Pond). Facility Pond flows will be routed to the Alpha Pond, which will serve as the final point of discharge from the mine site.

Dewatering flows from the Double Double and Kona Pits will be monitored until they are backfilled. Flow totalizers will be installed on dewatering discharge lines from the open pits as the pits and associated sumps are established and monitoring initiated when it is practical. The number and location of sumps in the Supremo Pit and Latte Pit are anticipated to vary through mine life and will be monitored accordingly.

Discharges from the rainwater pond will be monitored by pump totalizer in the event that water in this pond is of acceptable quality for discharge either to Alpha Pond or Latte Creek. Details related to monitoring of the Heap Leach Facility (HLF) are contained in the Heap Leach Facility Operations, Maintenance, and Surveillance Plan (Forte, 2022), while monitoring of the Water Treatment Plant discharges is included in Table 3-1.

Receiving environment monitoring will be conducted at stations on Latte Creek, Coffee Creek, YT-24, Halfway Creek, Kona Tributary and on the Yukon River, as well as Dan Man Creek, the latter of which serves as the undisturbed control drainage.

Data will be downloaded from the instrumented stations monthly during the ice-free period of May to November. Spot flow measurements will be made as necessary to maintain the existing rating curves, or to calibrate discharge values calculated from rated structures (e.g., weirs). Spot flow measurements will also be made during winter (when channel icing conditions allow) to improve the characterization of the winter low flow regime.

Table 3-1 Summary of Mine Site Discharge Flow Monitoring Stations.

Catchment	Station ID	Rationale	Method	Frequency	
				Construction	Operations
Halfway Creek	M1	Alpha Pond (MDMER ¹ EoP ²)	Weir and PT ³	Continuous if discharging	
	M2	HLF Event Pond 2 (EP-2)	Pump Totalizer	Record daily volumetric totals	
	M3	HLF Water Treatment Plant (Influent and Discharge)	Pump Totalizer		
	M4	Facility Pond	Weir and PT ³	Continuous if discharging	
	M5	Rainwater Pond	Pump Totalizer	Record daily volumetric totals; continuous if discharging	
	M6	HLF Event Pond (EP-N1)	Pump Totalizer	Record daily volumetric totals	
	M7	HLF Event Pond (EP-S1)			
	M8	Downstream Alpha WRSF Toe	Flow meter and/or salt dilution	Monthly, as possible given safety considerations	
	M9	Upstream Alpha WRSF			
	YT-24	M10	SU3W Spill Point (provisional MDMER ¹) ⁴	Flow meter/salt dilution or rated structure, as appropriate	Monthly, when passively discharging
M11		SU3 Spill Point (provisional) ⁴			
Latte Creek	M12	SU5 Spill Point (provisional MDMER ¹) ⁴			
	M13	SU4W Spill Point (provisional MDMER ¹) ⁴			
	M14	Double Double Spill Point (provisional MDMER ¹) ⁴			
	M15	SU1 Spill Point (provisional MDMER ¹) ⁴			

Notes:

HLF = Heap Leach Facility

¹Metal and Diamond Mining Effluent Regulations – Final Point of Discharge

²End of Pipe

³Pond outflows will be monitored using a rated structure, staff gauge and pressure transducer (PT), or pump totalizer. Monitoring will be continuous (15-minute interval) while ponds discharging, except the Event Pond, which is not expected to discharge.

Discharge from actively mined pits will be monitored by pump totalizer during dewatering.

⁴Monitoring will only be conducted at the pit spill points when passively discharging.

Table 3-2 Summary of Receiving Environment Flow Monitoring Stations.

Receiving Environment Hydrology Monitoring Stations					
Watercourse	Tributary	Station	Rationale	Method	Frequency
Coffee Creek	Latte Creek Trib 10 (LTC20)	LCT20-0.1	Monitor Latte Creek below Supremo South discharge point	V-notch weir, continuous water level	Continuous (Hourly)
	Latte Creek	LC-15.5	Monitor Latte Creek below HLF	Manual gauging, continuous water level	Continuous (Hourly)
		LC-11.4	Monitor Latte Creek below last point of mine effluent control	Manual gauging, continuous water level	Continuous (Hourly)
		LC-0.2	Monitor Latte Creek above confluence with Coffee Creek	Manual gauging, continuous water level	Continuous (Hourly)
	Coffee Creek	CC-11.6	Monitor Coffee Creek above confluence with Latte Creek	Manual gauging, continuous water level	Continuous (Hourly)
		CC-10.9	Monitor Coffee Creek below confluence with Latte Creek	Manual gauging, continuous water level	Continuous (Hourly)
YT-24	YT-24	YT24-0.1	Monitor YT-24 below Supremo North discharge point	Manual gauging, continuous water level	Continuous (Hourly)
Halfway Creek	Halfway Creek	HC-6.8	Monitor Halfway Creek below last point of mine effluent control	Manual gauging, continuous water level	Continuous (Hourly)
		HC-1.0	Proposed Water Quality Objectives (WQO) attainment point	Manual gauging, continuous water level	Continuous (Hourly)
		HC-0.1	Long-term flow monitoring station to correlate with HC-1.0	Manual gauging, continuous water level	Continuous (Hourly)
Dan Man Creek	Dan Man Creek	DMC-2.0	Proposed new Reference watershed	Manual gauging, continuous water level	Continuous (Hourly)
Independence Creek	Kona Tributary	KT-0.3	Far-field for Kona Pit	Manual gauging, continuous water level	Continuous (Hourly)

Table 3-3 Surface Water Monitoring Station Locations

Station ID	Mine Site Monitoring Stations	Easting	Northing
M1	Alpha Pond (MDMER ¹ EoP ²)	582,848	6,975,463
M2	HLF Event Pond (EP-2)	582,105	6,972,635
M3	HLF Water Treatment Plant (Influent and Discharge)	582,080	6,972,448
M4	Facility Pond	582,334	6,972,851
M5	Rainwater Pond	581,639	6,972,371
M6	HLF Event Pond (EP-N1)	581,523	6,972,434
M7	HLF Event Pond (EP-S1)	581,671	6,972,276
M8	Downstream Alpha WRSF Toe	582,637	6,975,135
M9	Upstream Alpha WRSF	581,064	6,973,450
M10	SU3W Spill Point (provisional MDMER ¹) ³	584,065	6,974,982
M11	SU3 Spill Point (provisional MDMER ¹) ³	584,632	6,975,349
M12	SU5 Spill Point (provisional MDMER ¹) ³	584,847	6,974,908
M13	SU4W Spill Point (provisional MDMER ¹) ³	584,706	6,973,285
M14	Double Double Spill Point (provisional MDMER ¹) ³	585,453	6,973,375
M15	SU1 Spill Point (provisional MDMER ¹) ³	584,100	6,973,228
Receiving Environment Monitoring Stations			
LCT20-0.1	Small tributary to Latte Creek	584,890	6,971,733
LC-15.5	Upper Latte Creek	581,317	6,970,960
LC-11.4	Latte Creek downstream of LCT20-0.1 drainage	585,071	6,971,654
LC-0.2	Latte Creek immediately upstream of confluence with Coffee Creek	594,319	6,970,375
CC-11.6	Coffee Creek immediately upstream of confluence with Latte Creek	594,719	6,970,225
CC-10.9	Coffee Creek downstream of confluence with Latte Creek	594,715	6,970,586
YT24-0.1	Mouth of YT-24, small tributary to Yukon River	589,526	6,979,073
HC-6.8	Halfway Creek below Alpha Pond	584,089	6,976,548
HC-1.0	Halfway Creek 1 km upstream from the Mouth	588,049	6,980,137
HC-0.1	Halfway Creek at the mouth	588,823	6,980,536
DMC-2.0	Dan Man Creek (Reference)	585,599	6,982,145
KT-0.3	Kona Creek, small tributary to Independence Creek	575,334	6,979,357

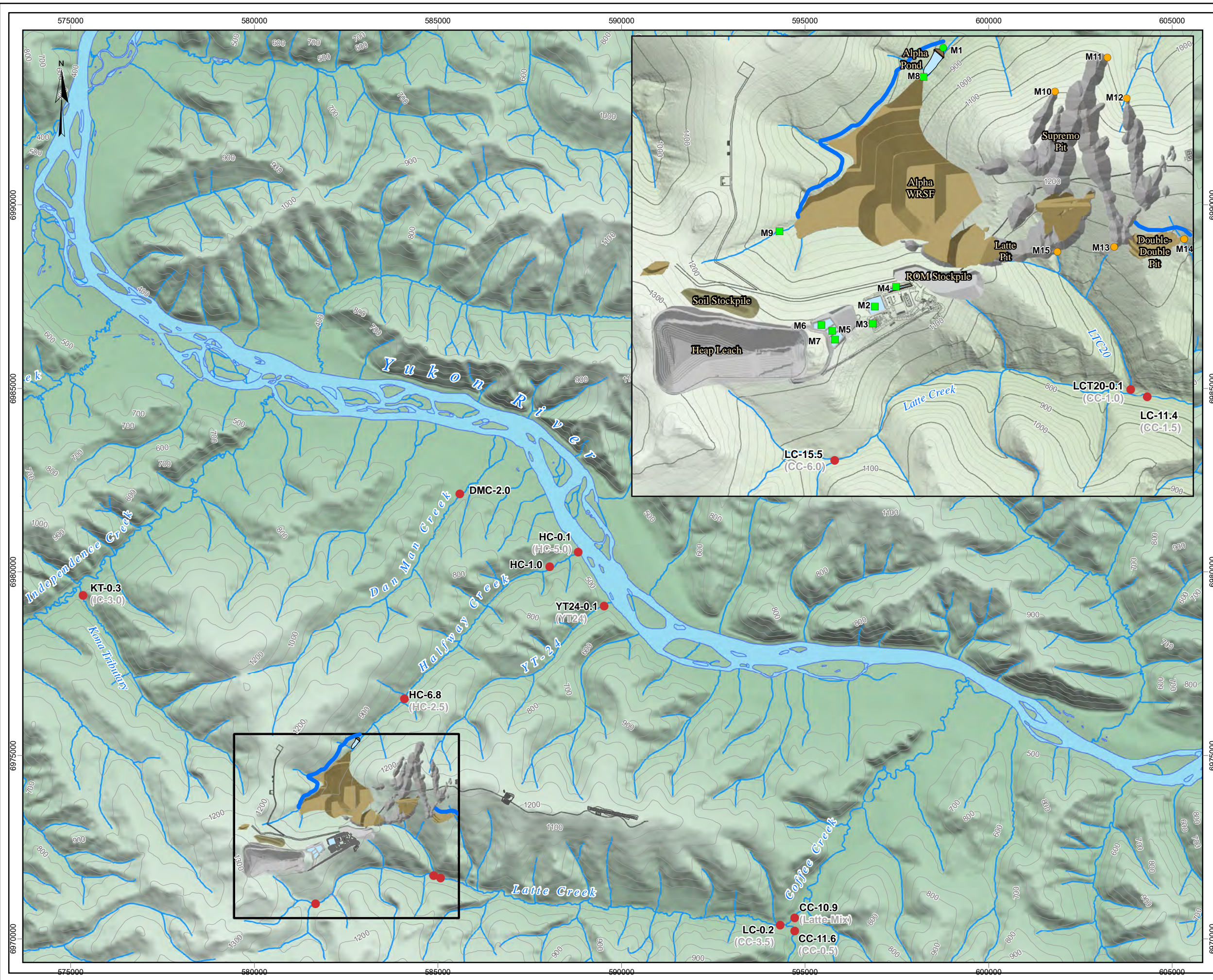
Notes:

All station co-ordinates are in UTM Zone 7

¹MDMER = Metal and Diamond Mine Effluent Regulations

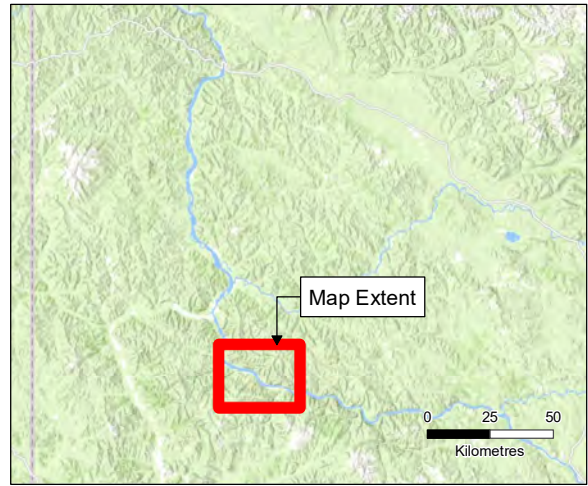
²EoP = End of Pipe

³Monitoring will only be conducted at the pit spill points when passively discharging.



COFFEE GOLD MINE

Hydrology Monitoring Stations



- Legend**
- Receiving Environment Station
 - Pit Sump/Sediment Pond, not subject to MMR
 - Provisional MDMER FPoD
 - MDMER FPoD
 - Watercourses
 - Waterbodies
 - Surface Contours (100m)

Notes

1. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.

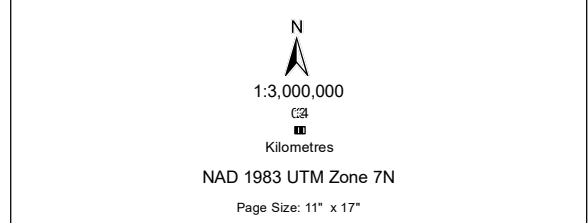


Figure 3-1	Date: Apr 15, 2024	Drawn by: AL	Reviewed By: SJ
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4.0 MONITORING METHODOLOGY

As detailed in the *Framework for Assessing the Ecological Flow Requirements to Support Fisheries in Canada* (DFO 2013), various methods can be used to assess the potential impact of flow alterations on fish habitat in the receiving streams. The hydrological methods category of analysis seeks to characterize the natural flow paradigm, where “...the management goal is maintenance of the many natural or historic characteristics of the hydrograph (amplitude, timing, frequency, duration, variability, etc.)”

Quantification of a hydrological regime is conducted through calculation of the key metrics of the streamflow regime, including annual runoff, monthly runoff distribution, low flows, and peak flows (Table 4-1). Refer to Section 3.3 of the EMAMP for details on the linkages between indicators and monitoring.

Table 4-1 Indicators for Surface Hydrology

Indicator	Rationale for Selection
Annual Runoff	Project activities (e.g., pit dewatering, water diversions, water use) have the potential to change the proportion of precipitation that reports as surface runoff on an annual basis.
Monthly Runoff Distribution	Water management ponds, open pits, pit lakes and WRSFs are known to alter (e.g., attenuate, enhance) the runoff signatures of mine-affected catchments on a monthly and seasonal basis.
Low Flows	Alterations to the existing groundwater regime and shallow interflow may result from Project development (e.g., pit development, waste rock placement).
Peak Flows	Alteration of the land surface and diversion of water via ditches may increase peak flows in the vicinity of the Project. Conversely, reductions in basin area may have the potential to reduce peak flows via reduction in contributing areas.

The selected indicators will be used to evaluate potential adverse changes, the subsequent effectiveness of mitigation measures, and to characterize potential residual adverse changes. The metrics are calculated using the measured parameters listed in Table 4-2, including measurements of water level and stream discharge. The frequency with which these parameters will be recorded will vary from 15-minute to monthly intervals, depending on the monitoring location and measurement method (Table 4-1). Discharge rates are calculated using a stage-discharge rating curve, which allows 15-minute continuous measurements of water level (stage) to be converted to the commensurate discharge rate. For mine site discharges, these will be measured either using flow totalizers on pumps, or rated structures (e.g., weirs) at the outlet of sediment ponds.

Table 4-2 Hydrological Measured Parameters

Parameter	Rationale for Selection	Frequency	Method
Water Level (Stage)	Required to base calculations of streamflow upon	15-minute	Pressure Transducer and Staff Gauge
Discharge (Streamflow)	Required to calculate dilution ratios, monitor potential mine related effects to baseline streamflow regime	Manual (monthly, as required for rating curve maintenance)	Flow meter, salt dilution, ADCP ¹
Discharge (Mine Site Effluent)	Required to calculate effluent loads discharged to receivers, determine rates of WRSF seepage and pit inflows	15-minute, daily, weekly (station specific)	Pump totalizers, rated structures

Notes:

¹Acoustic Doppler Current Profiler

4.1 Mine Site Monitoring

Flow monitoring will be undertaken to measure surface water discharge from mine facilities, (including sediment control ponds; event ponds; rainwater pond), and to measure flows in the receiving environment. Mine site flow monitoring is focused on understanding the volumes, timing, and distribution of water across the mine water management infrastructure. Monitoring will be conducted for water discharged from open pits and sediment control ponds (Sections 4.1.1 and 4.1.2), and the acquisition of continuous discharge data in the receiving environment (Section 4.1.4). It will also be necessary to verify established stage-discharge relationships at key sites from time to time, using a current meter or salt dilution gauging.

The monitoring system will be implemented in a systematic manner to ensure that reliable and consistent data is obtained. Key considerations include assignment of responsibilities, data management, and data interpretation and reporting.

4.1.1 Mine Site (Open Pits) Monitoring

The volume of water pumped out of open pits will be measured using flow totalizers installed on pump lines. The discharge from all pits (and sub-pits) will be monitored through mine life, including Latte, Double Double, Kona, and Supremo pits. Water discharged from pits, as recorded by the flow totalizers, will be tabulated, by pit. Water discharged from open pits will likely include some groundwater inflows, in addition to meteoric inputs. Analysis of pump volumes during dry periods (where meteoric inputs are nil) will aid in the refinement of pit groundwater inflow estimates. For those pits that form the final point of discharge (FPoD) under MDMER (stations M10 – M15 on Figure 3-1) water levels will also be monitored on a monthly basis once pit active dewatering ceases.

4.1.2 Effluent (Control Ponds) Monitoring

Normal discharge from the Alpha Pond via a rated structure (e.g., weir), or via pumping. Flow totalizers will be installed on discharge pipes to allow the rate of discharge to be continuously recorded. The rate of discharge will be averaged daily, and cumulative totals calculated and provided to the Mine Managers in the monthly reports.

There will also be an emergency spillway for the Alpha Pond, which will be designed based on a flood ranging between the 1 in 200-year return period and the 1 in 1,000-year return period. Flow through the

emergency spillway will be estimated manually when a storm event of this magnitude occurs, by reading the water levels from the staff gauge installed in the spillway, and calculating the flow based on the hydraulic relationship between water level and spillway cross-sectional area and slope.

4.1.3 Water Treatment Plant Effluent Monitoring

Treated effluent discharges from the water treatment plant will be monitored continuously, via a totalizer in the pipe. The rate of discharge will be averaged daily, and cumulative totals calculated and provided to the Mine Managers in the monthly reports. Further details on Water Treatment Plant (WTP) effluent monitoring are contained in the Heap Leach and Process Facilities Plan.

4.1.4 Receiving Environment

The existing network of instrumented receiving environment flow monitoring stations will be maintained throughout construction and operations phases, and the proposed mine site flow and water level monitoring stations will be installed as the infrastructure is commissioned (Figure 3-1). Solinst Levellogger Edge instruments supplied by Solinst LTC have been used at the currently instrumented stations and are housed inside protective stilling wells and obtain a measurement of the water level at regular intervals (generally on 15-minute intervals).

During each sampling event, the technician will perform the following tasks:

- Note the time, weather, general flow conditions, presence/absence of ice and staff gauge reading (before and after manual flow measurement to capture changes in stage during visit).
- Note any channel form changes (e.g., scouring at station, sediment buildup, altered hydraulic control, undercutting of banks).
- If station includes a weir or other rated structure (e.g., flume or discharge pipe outfall), inspect the site for signs of leakage or erosion around or under the structure, sediment buildup, changes in the hydraulic relationship, damage from ice or equipment, and algae growth or other obstruction.
- Inspect the instrumentation and logger for damage, moisture buildup, or any condition that could cause or lead to malfunction.
- Change desiccant packs as necessary.
- Download the data logger and visually inspect data for abnormalities.
- Make a manual measurement of flow, using a current meter, salt dilution, or other method as appropriate.
- If necessary and time permits, make a second measurement to constrain the measurement error.
- Estimate possible sources of error (fluctuating stage, inadequate salt slug dilution, etc.).
- Take photos of the staff gauge, upstream and downstream views, and anything else of note.

5.0 DATA CONTROL, ANALYSIS, AND INTERPRETATION

5.1 Document Control

Once the data has been collected from the monitoring stations, it will be entered by the responsible site personnel into a standardized hydrology database. This will form the primary record, and any adjustments or corrections that are performed on this data will be saved as separate files, to ensure that the original data records remain unaltered. All data and associated field notes will be stored in standard electronic format.

Following every site visit, the manual discharge and stage measurements will be checked against the existing rating curve to ensure the quality of the measurement, and the stability of the curve. The continuous water level data will be reviewed to ensure that the sensors are functioning properly, and that the offset between the staff gauge and transducer readings hasn't changed. Following each benchmark survey (conducted following spring breakup), the data will be checked for indications that the staff gauge has shifted (e.g., frost jacking), and if necessary, offsets for the future staff gauge measurements will be calculated and applied. At the conclusion of each open water season, the rating curves will be checked for consistency, and the continuous water level record will be corrected using the appropriate offsets and archived, along with the updated discharge record.

5.2 Quality Assurance and Quality Control

The primary objective of data QA/QC program is to ensure that the data collected by the site monitoring programs is both accurate and precise, and properly represents the parameters that the monitoring programs are intended to measure. This provides regulators, First Nations, the public and mine staff with confidence in the data collected by the monitoring programs, and thus in the conclusions and actionable responses drawn from these data. A brief outline of the QA/QC program is provided in this section.

The QA/QC program encompasses a range of actions, including:

- Regular checks and calibration of the instrumentation
- Automated error trapping and flagging for review in databases and spreadsheets
- Review of collected data by site environmental staff
- Periodic review, as necessary by external review by qualified professionals.

As the hydrology data is collected, it will be subject to several levels of review. The first will be done by site environmental staff and will involve checks for values that are outside seasonal norms, error codes, and trends in data that are not consistent with known site streamflow conditions (i.e., sensor drift, sensor failure). These will be flagged and noted in the original file, and all corrections will be saved to a secondary file with an appropriate label. Data QA/QC will consist of several steps.

1. Upon download of the data from dataloggers, include any error codes and note the condition of monitoring station and sensors, including the staff gauge and stilling wells, weirs or pump totalizers.
2. Photocopy field notes once back in the office and transcribe all notes into the database, including site photographs, if not captured digitally in the field.

3. Correct the water levels for barometric pressure fluctuations, plot the water levels, and in a different file (keep the original file unaltered) remove false readings, flag anomalous readings for follow-up and note any changes made.
4. Remove any water level data for natural streams that coincides with sub-zero water temperatures, as this data is likely ice affected, and the rating curve will not apply.
5. Flag missing data, and if possible, infill the missing data using relationships developed with other site stations. Note that this data is estimated.

The second level of review will be undertaken by the qualified professionals employed by or engaged by Newmont to produce annual reports and any updated estimates for relevant hydrologic parameters (e.g., peak flow estimates). This review will initially compare the original data file to the corrected one provided by site staff to ensure consistency and accuracy in the QA/QC process. Next, this review will examine the relationship between individual site hydrometric records and representative regional records collected by federal monitoring agencies.

1. The data will be cross-referenced between sources to confirm that accurate data is being collected, including:
 - a) Comparison of hydrograph peaks with the precipitation record (including snowmelt).
 - b) Comparison of unit yields ($L/s/km^2$) for stations within the same catchment, and then with stations in neighbouring catchments. These hydrographs should be similar, and significant deviations indicate a problem with the record being reviewed.
 - c) Comparison of unit yields with the nearest representative regional hydrometric station. This is currently the Indian River above the Mouth station (09EB003), run by the Water Survey of Canada.

Following the above checks, any anomalies or errors that are unresolved should be noted in the monthly and annual reports, as this will provide context for any findings resulting from the monitoring program that may appear anomalous.

5.3 Data Analysis

The hydrology indicators listed in Table 4-1 form the basis for assessment of the streamflow regime in the local receiving watercourses. A summary of the steps taken to calculate these parameters is provided below.

5.3.1 Annual Runoff

Annual runoff is calculated by converting the total annual discharge volume (in m^3) to a runoff depth (in mm), by dividing the discharge volume by the drainage area of the monitoring station in question. This will be done for the receiving environment stations listed in Table 3-2, and where the contributing area is known with certainty (i.e., no unrecorded pumped flows from other catchments reporting to the station), for some of the mine site monitoring stations (e.g., Facility Pond and Alpha Pond). Note that for many stations, the annual runoff calculated from the monitoring record will not include flows under ice, and therefore the calculated runoff will be lower than the actual runoff. In Halfway Creek, the ice-affected period (October to April) typically constitutes 4% of annual runoff, and 9% in Coffee Creek.

5.3.2 Monthly Runoff Distribution

The monthly runoff distribution is calculated by dividing each month's runoff by the annual total and is presented as a percentage. As stated above, the lack of data during winter months will result in the monthly percentages of annual total runoff for the open water season being biased slightly high, but the overall effect will be small. It should be noted when reporting these values that they represent the percentage of total open water season flow, which is slightly lower than the actual annual total.

5.3.3 Low Flows

Low flows can be characterized in a number of different ways, but for the purposes of this monitoring plan, the minimum rolling 7-day average low-flow for the period of June to September should be used as the metric for the local receiving streams.

5.3.4 Peak Flows

Peak flows are calculated for each station as the maximum instantaneous (either 15-minute or 1-hour reading, depending on the transducer's logging interval) discharge in a given year. These typically occur at site during the spring freshet, or as a result of the intermittent convective rainfall events common during July and August. On occasion, the annual peak flow will occur during freshet, when ice cover still remains in the stream channels. As this ice will invalidate the hydraulic relationship between stage and discharge that the rating curves are based on, it may not be possible to accurately quantify the peak flow during this period.

6.0 REPORTING AND ANNUAL REVIEW

Reporting to satisfy Water Use License (WUL) requirements will be completed on a monthly (data sharing), and annual basis (data analysis and interpretation), as detailed below.

6.1 Monthly Data Reports

Monthly regulatory reports to meet WUL requirements will summarize all data collected as part of the hydrologic monitoring program. These reports will also note any changes that have been made to the monitoring network, including sampling location, frequency, and parameters. These data reports will provide the water quantity context for the measured water quality in mine effluent and the receiving streams, the management of operations, and the water management strategy in particular. Specific information to be provided in these reports is as follows:

- Water management pond levels and discharges
- Open pit water levels (if lake forming) and discharge rates (dewatering or discharge via spillway)
- Average monthly flows, instantaneous peak flows and general commentary on receiving stream discharge regimes
- Monthly rainfall and snow melt totals, or snow water equivalent (SWE) if snow courses being conducted.

6.2 Annual Interpretive Reports

Annual regulatory reports to meet WUL requirements will encompass data from the meteorology, surface and ground water, heap leach and waste rock monitoring programs. These reports will summarize the data collected for the previous year in tabular and graphical format, as well as providing summary statistics (e.g., monthly rainfall and temperature summaries, precipitation (snow and rain) as a percent of the long-term average, discharge and water quality, etc.). Rating curves will be reviewed annually and adjusted if necessary. In addition to the linkages with site water management activities, the annual report will place the presented data into context with operation of the heap leach facility, pit lake levels and volumes (where present), sediment pond volumes and discharge rates, and the stream flows in the receiving environment. Finally, critical linkages will be made between the surface water quality and quantity monitoring results and mine site effluent volumes, receiver stream volumes and the annual precipitation regime.

For the hydrology monitoring program, the following data will be included in the Annual Interpretive Report:

- Final daily discharge / streamflow records for the year for all monitoring sites
- Manual discharge measurements from all sites
- Up-to-date corrected water level records
- Benchmark surveys and adjustments made to the staff gauge-pressure transducer offsets
- Dates of transducer installation / removal
- Updated rating curves, with discussion of adjustments made, discrepancies and errors
- Summary statistics for water quantity (average discharge, unit yields, monthly and annual runoff depths, peak flows, low flows)
- Relationships with site and regional climate data.

Any significant changes to the monitoring network, such as changes to instrumentation, or location of monitoring points will be noted, along with a rationale for the changes. If necessary, recommendations will be made concerning upgrades or changes that are deemed necessary for the following year, along with the rationale.

Finally, the annual report will relate the site-data to the regional climate and streamflow records and make note of instances where the site conditions diverge substantially from the regional signal. Where evidence exists for an event (e.g., large rainfall event) or trend (e.g., pit lake volumes increasing faster than projected), the monitoring program will be revisited. This will occur in concert with a review of water management protocols, and infrastructure design criteria (for example).

7.0 REFERENCES

DFO. 2013. Framework for Assessing the Ecological Flow Requirements to Support Fisheries in Canada. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2013/017.

Environment Canada. (2009). Environmental Code of Practice for Metal Mines. Mining and Processing Division, Environmental Stewardship Branch. Ottawa. ISBN: 978-1-100-11901-4.

Forte Dynamics Inc. (2022). Heap Leach Facility Operations, Maintenance, and Surveillance Plan. Prepared for Newmont Corporation by Forte Dynamics Inc.

Newmont Goldcorp Inc. 2017. The Coffee Gold Mine, Project Proposal for Executive Committee Screening, Pursuant to the Yukon Environmental and Socio-economic Assessment Act. March 2017.